

**Amendments to the Claims:**

This listing of claims replaces all prior versions and listings of the claims.

- 1-23. (Cancelled).
24. (Currently Amended) A system for characterizing physiological activity comprising:  
a sensor array for detecting a plurality of features indicative of physiological activity of an isolated biological sample and producing signals representative of said features;  
a transducer coupled to said sensor array for converting said signals into a machine readable form; and  
a processor coupled to said transducer, the processor configured to derive a vector quantity from said signals, the vector quantity comprising a number of dimensions equal to a number of different features derived from the signal output of said sensor array.
25. (Currently Amended) The system of claim 24, further comprising an amplifier coupled to said sensor array for amplifying the signals from the sensor.
26. (Previously Presented) The system of claim 25, wherein the amplifier is a multi-channel amplifier.
27. (Previously Presented) The system of claim 24, wherein the sensor array comprises a plurality of electrodes.
28. (Currently Amended) The system of claim 24, wherein said processor comprises a clustering algorithm selected from a polythetic agglomerative algorithm, a k-means algorithm or an iterative relocation algorithm.
29. (Cancelled).
30. (Previously Presented) The system of claim 24, wherein said physiological activity is static or changing physiological activity.

31. (Previously Presented) The system of claim 24, wherein the physiological activity is intracellular activity, extracellular activity, or a combination thereof.
32. (Currently Amended) The system of claim 24, wherein the physiological activity is endogenous cellular activity or physiological activity in response to an external stimulus.
33. (Cancelled).
34. (Currently Amended) The system of claim 33, wherein the stimulus is a ~~natural or a synthetic stimulus~~ known or an unknown toxin or chemical compound.
35. (Cancelled).
36. (Cancelled).
37. (Previously Presented) The system of claim 24, wherein the physiological activity is electrical, chemical, fluorescent, or luminescent activity falling within the electromagnetic spectrum.
38. (Previously Presented) The system of claim 24, wherein the feature is an amplitude dependent feature.
39. (Previously Presented) The system of claim 24, wherein the feature depends upon a recovery rate of one or more cells in response to an external stimulus.
40. (Currently Amended) The system of claim 39, wherein the stimulus is a ~~natural or a synthetic stimulus~~ known or an unknown toxin or chemical compound.
41. (Cancelled).
42. (Cancelled).
43. (Previously Presented) The system of claim 24, wherein the biological sample comprises a tissue or a cell sample.

44. (Currently Amended) The system of claim 43, wherein the biological sample is a cell sample comprising electrically active cells selected from cardiomyocytes, muscle cells, or neuronal cells.

45. (Cancelled).

46. (Previously Presented) The system of claim 24, wherein the detected feature is an electrical signal.

47. (Currently Amended) The system of claim 46, wherein the electrical signal is an intracellular signal or an electrical signal generated by an external cellular membrane.

48. (Cancelled).

49. (Previously Presented) The system of claim 24, further comprising memory.

50. (Previously Presented) The system of claim 49, wherein the memory comprises a library of features characterizing known compounds.

51.-74. (Canceled).

75. (New) The system of claim 26, wherein said vector quantity comprises components representative of both local and global features across said channels.